Rejections under 35 USC §103

Claims 44, 46, 48, and 51-65 have been rejected under 35 USC §103(a) as being unpatentable over Ross '243 (US Patent No. 5,525,243) in view of Jensen '806 (US Patent No. 5,958,806 - using the PCT publication date of July 20, 1995).

Claim 50 has been rejected under 35 USC §103(a) as being unpatentable over Ross '243 in view of Heffner '470 (US Patent No. 5,514,470) or Wiley '736 (US Patent No. 5,494,736).

These rejections are traversed for the following reasons.

Present Invention

The present invention relates to a polyolefin-containing fiber carrying at its surface a hydrophobic finish comprising 0.01-1.0% by weight of the fiber of at least one water-insoluble ester of a mono-, di-, tri- or tetrahydric alcohol with a molecular weight not exceeding 500 and a branched or straight chain fatty acid with between 12 and 30 carbon atoms.

Disclosure of Ross '243

Ross '243 discloses a finish composition and process for enhancing the cohesion of fibers and textile materials wherein the composition contains from 7 to 20 weight percent of an anti-static agent, from 0 to 80 weight percent of an emulsifier, from

15 to 50 weight percent of a polyethylene glycol, and the balance, a lubricant.

Disclosure of Jensen '806

Jensen '806 discloses a method for producing cardable, hydrophobic polyolefin-based staple fibers by applying to spun filaments a first spin finish comprising at least one cationic anti-static agent. In particular, a quaternary ammonium salt is used. Then, the filaments are stretched, and applied to the stretched filaments is a second spin finish in the form of a dispersion comprising at least one hydrophobic lubricant selected from a fatty acid amide condensation product and a hydrocarbon wax. The second spin finish optionally further comprises a poly-diorganosiloxane in an amount of up to 15% by weight. After stretching the filaments, crimping, drying and cutting are performed on the filaments to obtain staple fibers; as well as textured, cardable, polyolefin-based staple fibers prepared by the method and hydrophobic non-woven materials produced from such fibers. The fibers are able to be carded at extremely high speeds and are said to be suitable for use in the preparation of thermally bonded hydrophobic non-woven fabrics in which a dry, water-repellant surface, which can function as a liquid barrier is desired. Proposed uses for the fibers of

Jensen '806 include disposable diapers, feminine hygiene products and medical products.

Disclosure of Heffner '470

Heffner '470 discloses a composite elastic necked-bonded material including at least one necked material joined to at least one elastic sheet. The composite elastic necked-bonded material is stretchable in a direction generally parallel to the direction of constriction or necking of the necked material. Heffner '470 also discloses a method of producing a composite elastic necked-bonded material by extruding a film of substantially molten elastomer through a die tip, depositing the extruded elastomeric film onto a tensioned, necked material within from about 0.1 to about 1 second of exiting the die tip to form a multilayer material, and then immediately applying pressure to the multilayer material to bond the tensioned, necked material to the elastomeric film.

Disclosure of Wiley '736

Wiley '736 discloses high elongation thermally bonded nonwoven fabrics, which exhibit elongation of at least about 130% in the cross-machine direction. The fabrics of Wiley '736 include a nonwoven web of polyolefin staple fibers having an elongation of at least 400 percent, and a multiplicity of

discrete thermal bonds throughout the web to provide a bond area of from 8 to 25 percent of the area of the fabric.

Removal of the Rejections over Ross '243 in view of Jensen '806 and over Ross '243 in view of Heffner '470 or Wiley '736

None of Ross '243, Jensen '806, Heffner '470 or Wiley '736 can render obvious the instant invention either used separately or together for the following reasons.

None of the cited references disclose or suggest that the elements of claims 44 and 48 and claims dependent therefrom would achieve the hydrophobicity of the present invention.

Ross '243 teaches a finish composition for enhancing fiber cohesion. Ross '243 teaches compositions comprising 15-50% PEG 400. A fiber finish upon a fiber or non-woven comprising 15-50% PEG 400 will not explicitly or implicitly have the physical properties of the present invention. The active ingredient of the hydrophobic fiber finish of the present invention is water-insoluble whereas that of Ross '243 (PEG400) is water-soluble. The lubricant added by Ross '243, tridecyl stearate, is not water-soluble. However, despite tridecyl stearate being hydrophobic, it does not impart its hydrophobic represented properties to the finish to an extent wherein the finish by Ross '243 can be considered hydrophobic as will be described below.

As discussed supra and as the Examiner is aware, a *prima facie* 35 USC §103 rejection requires that all of the limitations

of claim 44 must be taught or suggested by the combined prior art references with a reasonable expectation of success. The manner in which hydrophobicity can be increased is not taught or suggested by any of the cited references to an extent for the skilled person to expect success in achieving high hydrophobicity.

The Examiner requests references that would clarify whether fibers are hydrophobic or hydrophilic. The fibers in Example VI of Ross '243 have a sinking time, which clearly provides a demarcation that said fibers are hydrophilic.

According to ASTM D1117-79, "Sink Time" method, fibers are considered hydrophobic if they exhibit a sink time of preferably at least about 0.8 hour, more preferably at least about 4 hours, and most preferably at least about 20 hours (see James H. Harrington '481 (US Patent No. 5,545,481 col.14 line 14-19). Sink time is an appropriate measure for hydrophobicity given polypropylene fibers having a density of approximately 0.91 g/cm^3 and the degree of wetting determines the time to sink below the surface of water.

As shown by the results of the 37 CFR § 1.132 Declaration executed by one of the inventors, F. Stengaard, dated August 29, 2002, the compositions of Ross '243, namely Examples VIa and VIb, have sinking times of 18 and 4 seconds, respectively. According to the standard assessment of sinking times, these

examples are hydrophilic whereas the comparative example (Example 5) from the current application does not sink even after 86400 seconds (24 hours) and is consequently strongly hydrophobic.

Thus, the Applicant respectfully wishes the Examiner to acknowledge that the fibers of Ross '243 are not hydrophobic, as the term is generally used by the person skilled in the art, irrespective of which measure one uses. The measure of sink time demonstrates the demarcation, said demarcation being apparent irrespective of the method one used to define the term "hydrophobic".

Furthermore, F. Stengaard, swore in the Rule 132 declaration dated August 29, 2002 that the finish by Ross '243 is not a hydrophobic finish, as would be recognized by the person of ordinary skill in the art. This issue is addressed as explained above wherein the "sink time" is used as a measure of demarcation between hydrophobic and hydrophilic. It is to be taken as given that the fibers of Ross '243 are hydrophilic, as sworn by F. Steengaard. The Applicant requests that the Examiner acknowledge that the fibers of Ross '243 do not have the hydrophobic properties of those of the present invention.

Jensen '806 fails to make up the deficiencies of Ross '243. Jensen '806 teaches a hydrophobic finish comprising a fatty acid amide. Furthermore, Jensen '806 teaches that an anti-static

agent is added in the first spin finish. Thus, Jensen '806 teaches a class of hydrophobic finishes very different to those of the present invention. All of the features or elements of the present invention are not taught by Jensen '806. Jensen '806 only discloses the advantages associated with hydrophobic finishes. Jensen '806 is silent as to the means of achieving the overall finish as defined by the present invention. In particular, the present invention further achieves the advantage that the anti-static agent may be added in a later processing step so that the finish imparts greatly on the hydrophobicity of the fiber, unlike the teachings of Jensen '806.

As the Examiner is aware, to make a *prima facie* rejection under 35 USC §103, all of the limitations of claim 44 must be disclosed or suggested by the combined prior art references with a reasonable expectation of success. The manner in which one can increase hydrophobicity is not disclosed or suggested by any of the cited references to an extent that the ordinarily skilled artisan would expect success in achieving a high hydrophobicity. The person of ordinary skill in the art would not have been able to apply the teachings of Jensen '806 to Ross '243 to arrive at the fiber/finish of the present invention nor would one expect the fibers of the present invention to achieve success in items of hydrophobicity.

The Applicant has prepared fibers within the scope of the present invention, yet outside the scope of Jensen '806, and has found that the utility determines how the fibers are made. The present invention achieves a simple and elegant means of obtaining a hydrophobic fiber, unlike the finish achieved by Jensen '806. The fibers of the present invention are hydrophobic by means of applying a finish where the active ingredient is a water-insoluble ester, which also acts as the lubricant as well as the cohesive agent. PEG is not suitable in the amounts suggested by Ross '243 in combination with any amount of tridecyl stearate. The fibers of the present invention remarkably, in light of the overall teaching of Jensen '806, teaches an elegant method of achieving hydrophobicity.

In one of the embodiments of the present invention, further advantage can be achieved by adding the anti-static agent in a later processing step so that the finish imparts hydrophobicity of the fiber, unlike the teachings of Jensen '806.

Thus, Ross '243 cannot render obvious the instant invention because if fails to disclose hydrophobic fibers. Jensen '806 fails to make up the deficiency because it discloses a completely different means of achieving hydrophobicity.

Moreover, in response to the Examiner's comments, the Applicant wishes to point out that although the tables in the Rule 132 declaration contain no definitions as to hydrophilic

vs. hydrophobic fibers, the tables demonstrate the difference between hydrophilic and hydrophobic properties. Table 1 shows a comparison between a standard hydrophilic fiber and a rewettable fiber by measuring multiple strike-through values (multiple strike-through values are measured on the very same test spot of the sample 3 times in succession). This test shows that for standard hydrophilic fibers, the finish can be washed off rendering the fiber hydrophobic, as shown by a large increase in strike-through. It is of no consequence that numerical strike-through values for a hydrophilic staple fiber can be >300, as the Examiner has noted, because it only shows the effect of removing the hydrophilic finish, leaving the polypropylene fiber with no, or only marginal amounts of finish. This is in fact due to the properties of polypropylene fiber itself (without finish or with highly reduced amounts of finish), which is by nature hydrophobic. In contrast, the rewettable fibers will lose only a minor amount of the rewettable finish. Consequently there will only be a minor effect on strike-through values, which does not influence their hydrophilic behavior.

EDANA, ERT: "Liquid Strike Through Time 150.3-96" is a test for single strike through values i.e., first strike-through. Tables 1 and 3 in the declaration, dated August 29, 2002 demarcates the hydrophilic non-woven fibers, which show values less than 3 seconds from hydrophobic non-woven with values

greater than 300 seconds for hydrophilic. This is a clear distinction between hydrophilic and hydrophobic non-woven. In the art, however, there is no clear demarcation for hydrophilic or hydrophobic non-woven fibers as terms such as "semi-hydrophobic non-woven" are employed when the strike-through values are in between the above values.

Moreover, table 3 in the declaration shows the influence of possible migration of hydrophilic or rewettable finish from a hydrophilic sheet to a hydrophobic sheet. Please note that the hydrophobic sheet has a strike-through value of >300 seconds. As can be seen from the Table, the hydrophilic spun-bond finish and the rewettable, Silastol PHP type finish does not migrate. Yet, strike-through values are still greater than 300 seconds. The rewettable, conventional finish does result in reduced strike-through values on the order of approximately 5 and 8 seconds due to finish migration. This is not an indication that strike-through values as low as 5 seconds represent hydrophobic fibers, but rather the effect of the hydrophilic finish that has migrated to the hydrophobic sheet. Migration may occur during storage time, rendering the non-woven hydrophilic, and for example causing leakage (due to wetting) of diapers as stated in the written description on page 2, lines 10 *et seq*. Please note that the values for Ross '243 examples VIa and VIb in the

declaration are within the same order of values: 6.5 and 3.5 seconds, respectively.

In conclusion, strike-through values depends on the wetting characteristics of the non-woven and hence the fibers i.e., the ability to be wetted by water. The definition of hydrophilic/hydrophobic above and ASTM D1117-79 "Sink Time" can be translated to strike-through values in the sense that hydrophobic fibers will not be wetted, or wetted poorly resulting in high sink times as shown above. By the same reasoning, the strike-through values will be high because a lack of wetting will prevent water from passing through the non-woven within a reasonable time. The test will not run beyond 300 seconds, which means that a non-woven giving strike through values of 300 seconds or more contain highly hydrophobic fibers (see Jensen '806 at col. 18 line 35-40).

Non-woven repellency (non-woven WRC) is the water-repellent character defined as the resistance to strike-through of distilled water displayed by the non-woven. This means that in principle strike-through measurements and WRC measurements depend on the wetting characteristics of the non-woven fibers and hence the fibers (i.e. as determined by sinking times as discussed above). The data also shows that non-woven made of hydrophilic fibers (fibers having low sinking times, for example below 0.8 hours) such as Ross '243 Examples VIa and VIb have low

strike-through times (a few seconds) as well as low WRC values. In contrast, non-wovens made of hydrophobic fibers (fibers having high sinking times for example, above 24 hours) have a high strike-through time (i.e., greater than 300 seconds) as well as high WRC values. See Jensen '806 et al. col. 17 line 50-57. For non-wovens containing highly hydrophobic fibers the repellency should be at least 3.5 cm, more preferably at least 4.0 cm, e.g. at least about 5.0 cm.

Thus, the Applicant reiterates his contention that the fibers of the present invention are considered by the person of ordinary skill in the art as comprising a hydrophobic finish whereas the fibers according to Ross '243 are not considered hydrophobic, as measured by the standard method of "sink times". The Applicant wishes to reiterate that this measure (sink time) demonstrates the demarcation between hydrophobic and hydrophilic, said demarcation being apparent irrespective of the method one used to define the term "hydrophobic".

Heffner '470 or Wiley '736 fail to make up the deficiencies of Ross '243. Neither Heffner '470 nor Wiley '736 even contain the word "hydrophobic" in their patents.

Because Ross '243 fails to disclose or suggest hydrophobic fibers, the rejections over Ross '243 in view of Jensen '806 and over Ross '243 in view of Heffner '470 or Wiley '736 are

inapposite. Withdrawal of the rejections is warranted and respectfully requested.

Pursuant to 37 C.F.R. §§ 1.17 and 1.136(a), Applicant(s) respectfully petition(s) for a two (2) month extension of time for filing a reply in connection with the present application, and the required fee of $410.00 is attached hereto.

With the above remarks, it is believed that the claims, as they now stand, define patentable subject matter such that a passage of the instant invention to allowance is warranted. A Notice to that effect is earnestly solicited.

If any questions remain regarding the above matters, please contact Applicant's representative, T. Benjamin Schroeder (Reg. No. 50,990), in the Washington metropolitan area at the phone number listed below.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

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